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BIOLOGICAL POLLUTION SURVEYS
OLDMAN RIVER
BOW RIVER
RED DEER RIVER
NORTH SASKATCHEWAN RIVER
1970-71

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POLLUTION REPORT NO.3

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SUMMARY REPORT
BIOLOGICAL POLLUTION SURVEYS

OLDMAN RIVER
BOW RIVER
RED DEER RIVER
NORTH SASKATCHEWAN RIVER
1970 - 1971

by
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Pollution Research Biologist

ALBERTA FISH AND WILDLIFE DIVISION
GOVERNMENT OF THE PROVINCE OF ALBERTA
DEPARTMENT OF LANDS AND FORESTS

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OLDMAN RIVER REPORT

The biology of the Oldman River upstream and downstream from the City of Lethbridge was investigated in relation to wastes arising from municipal and industrial discharges. Judgements regarding the pollution status of this river are presented in Fig. 1. These judgements are based on the definition of pollution as being any degradation of the natural biological state. The degree of degradation is expressed as a percent. The percent indicates what fraction of the total number of animals collected were clean water associated animals. As can be seen in Fig. 1 samples of animals living on the bottom of the river were collected in the fall of 1970 and in the spring of 1971. In the fall of 1970, the percent of clean water associated organisms, such as stonefly, caddisfly and mayfly larvae, that are sensitive to organic wastes was reduced for a distance of 40 to 50 stream miles downstream from the source of these wastes. Complete stream recovery was noted at station number 4 and 5, 52 and 66 stream miles downstream from the source of the wastes.

In the spring of 1971, the percent of clean water associated organisms was again reduced for a distance of approximately 40 to 50 stream miles downstream from the source of the City of Lethbridge municipal and industrial wastes. One change was noted from the fall samples. This change was a reduction in the percent of clean water associated organisms at sample site number 5, 66 river miles downstream from our control section.

The comparison of the 1971 spring sample and the 1970 spring sample, Figs. 1 and 2 respectively, reveals that the sample sites number 5 and 6 were in a much better biological condition in the spring of 1971 then they were in the spring of 1970. Increased river flows

during the winter and additional pollution abatement equipment installed by municipalities and industries, as revealed in the Department of the Environment Report, can be thanked for these improved results.

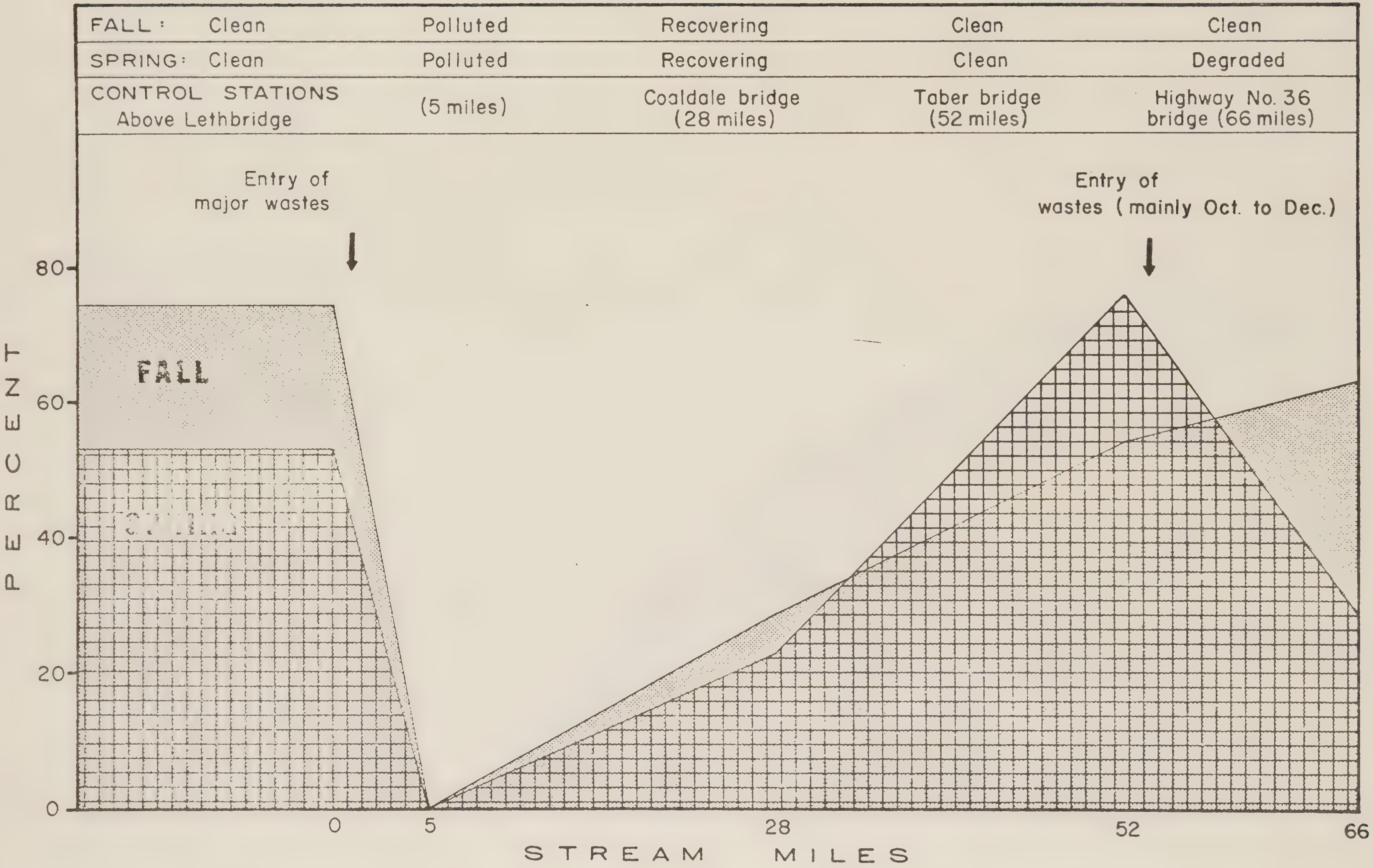

Figure 1. Oldman River – The percent of clean water animals found at each sampling station in the fall and spring of 1970 - 1971.

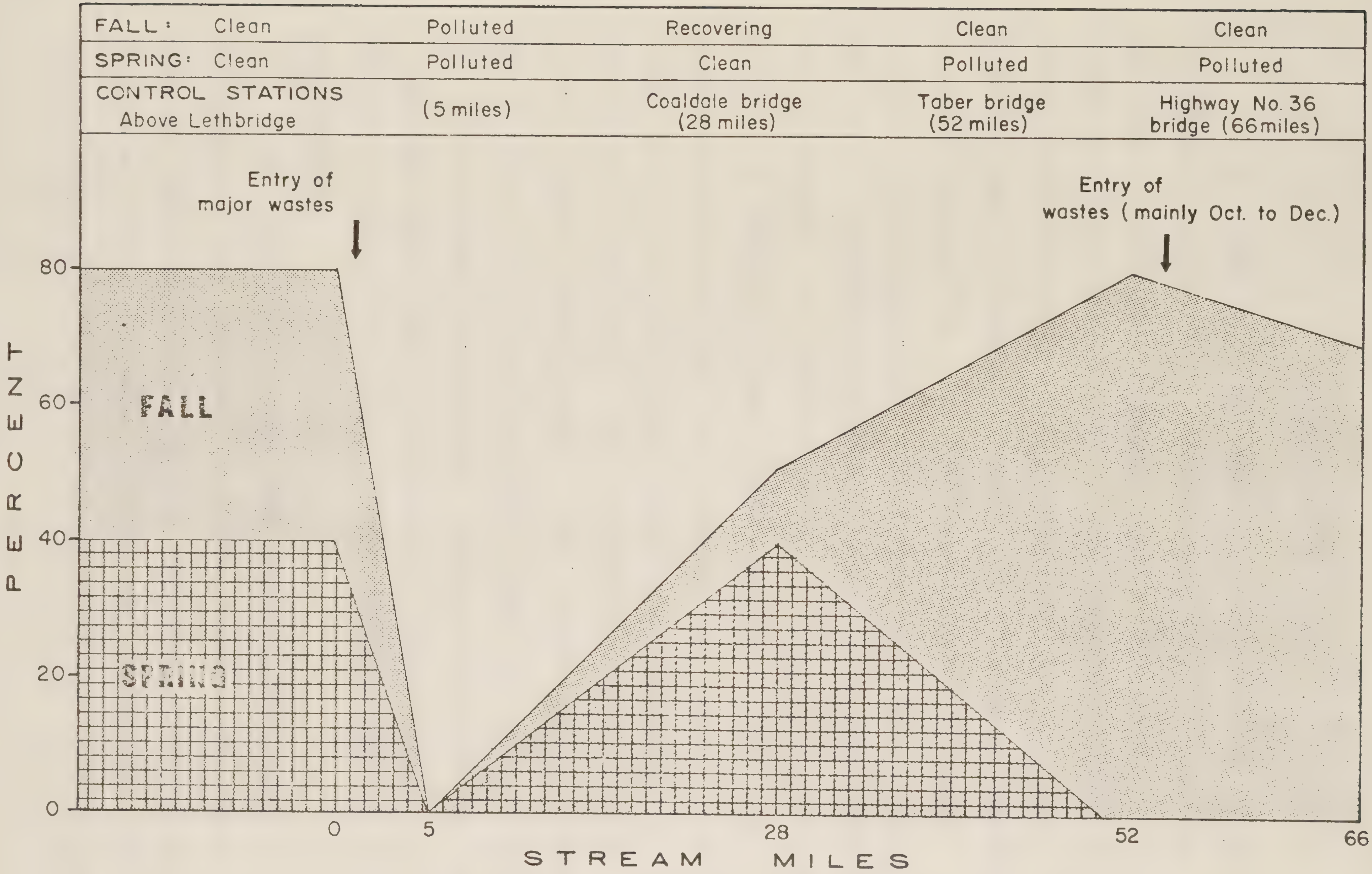

Figure 2. Oldman River – The percent of clean water animals found at each sampling station in the fall and spring of 1969-1970.

BOW RIVER REPORT

The biology of the Bow River in the vicinity of the City of Calgary was investigated in relation to wastes arising from municipal and industrial discharges. Judgements regarding the pollution status of this river are presented in Fig. 1. These judgements are based on the definition of pollution as being any degradation of the natural biological state. The degree of degradation is expressed as a percent. The percent indicates what fraction of the total number of animals collected were clean water associated animals. As can be seen in Fig. 1 and in Fig. 2, the percent of clean water associated organisms, such as stonefly, caddisfly, and mayfly larvae that are sensitive to organic wastes was as in the 1969 and 1970 winter season reduced for a distance of approximately 70 to 80 river miles. Complete stream recovery was noted at this point. The results revealed that the river had remained in the same condition in the fall of 1969, in the spring of 1970, and in the fall of 1970. However, the spring sample of 1971 revealed biological improvement at the site 40 miles downstream from Calgary. This is an encouraging sign. One is tempted to correlate this improvement with the installation of secondary sewage treatment facilities in the City of Calgary. The Department of the Environment Report may provide further explanation for this improvement.

As is well known, the Bow River downstream from Calgary is a very productive river. The condition of this river poses the classical question. "Where does one cross the line from enrichment to pollution of a stream"? Further information regarding the increased productivity of the river due to the introduction of organic material, in the city of

Calgary, is being gathered. Hopefully, this will provide guidelines to determine at what point pollution begins and enrichment ends.

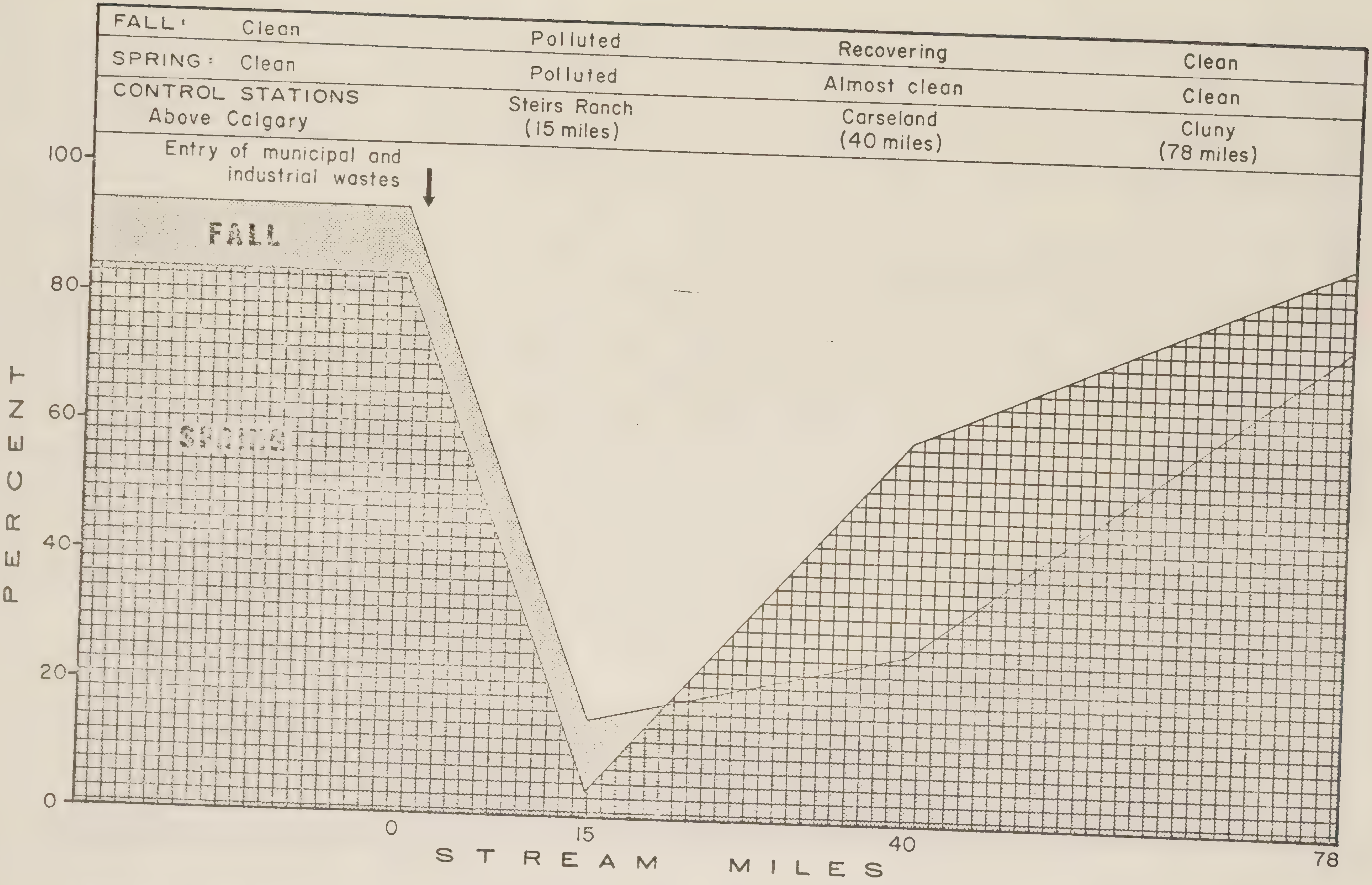

Figure 1. Bow River – The percent of clean water animals found at each sampling station in the fall and spring of 1970-1971.

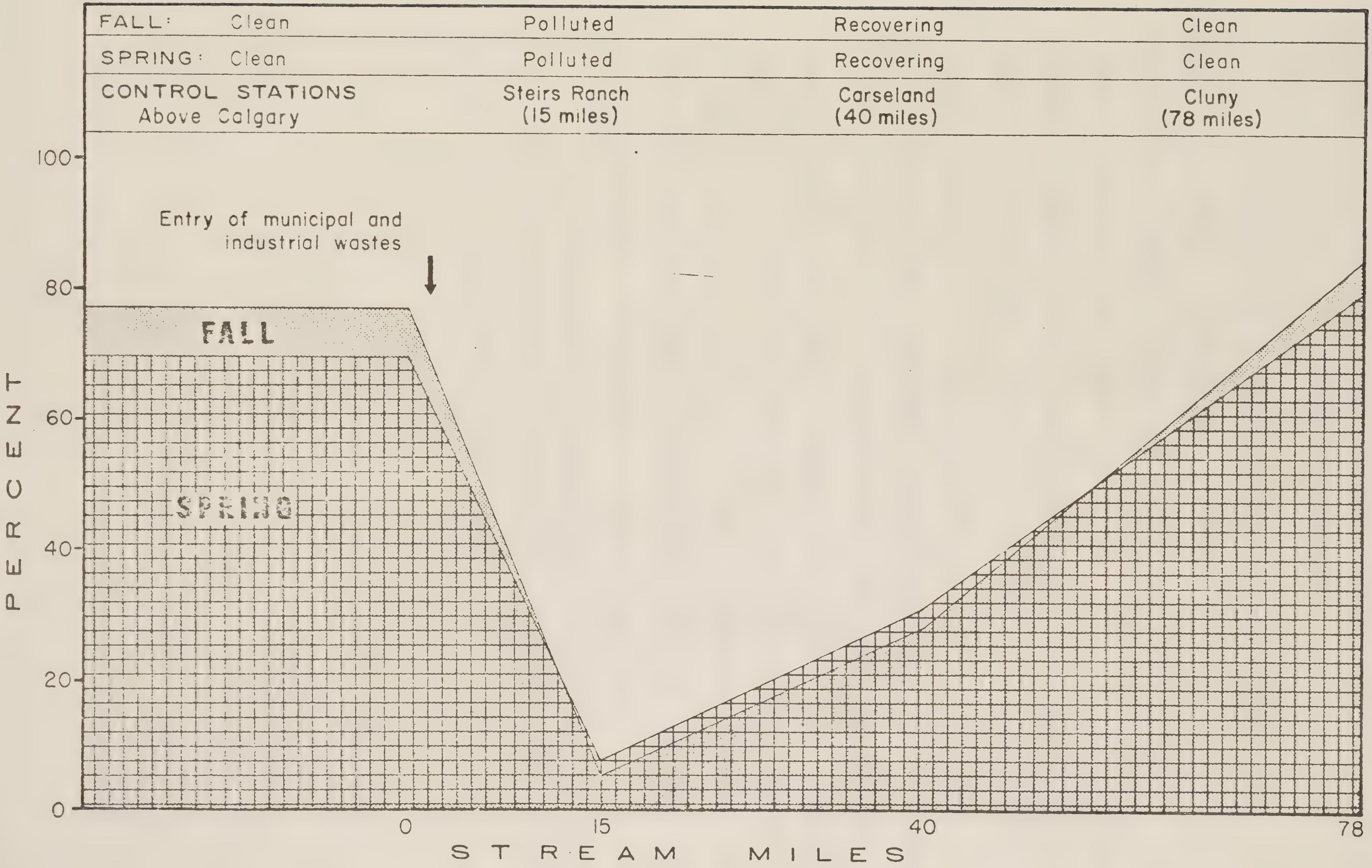

Figure 2. Bow River – The percent of clean water animals found at each sampling station in the fall and spring of 1969-1970.

RED DEER RIVER REPORT

The biology of the Red Deer River in the vicinity of the City of Red Deer was investigated in relation to wastes arising from municipal and industrial discharges. Judgements regarding the pollution status of this river are presented in Fig. 1. These judgements are based on the definition of pollution as being any degradation of the natural biological state. The degree of degradation is expressed as a percent. The percent indicates what fraction of the total number of animals collected were clean water associated animals. As can be seen in Fig. 1 the percent of clean water associated organisms, such as stonefly, mayfly, and caddisfly larvae, that are sensitive to organic wastes was not significantly affected by waste discharge in the fall of 1970. The spring sample of 1971 reveals a slight degradation in the percent of these clean water organisms at the Joffre bridge site. The river has completely recovered at the Nevis bridge site.

It is encouraging to note that the Red Deer River was in a better biological condition in the spring of 1971 as compared with the spring of 1970, Figs. 1 and 2 respectively.

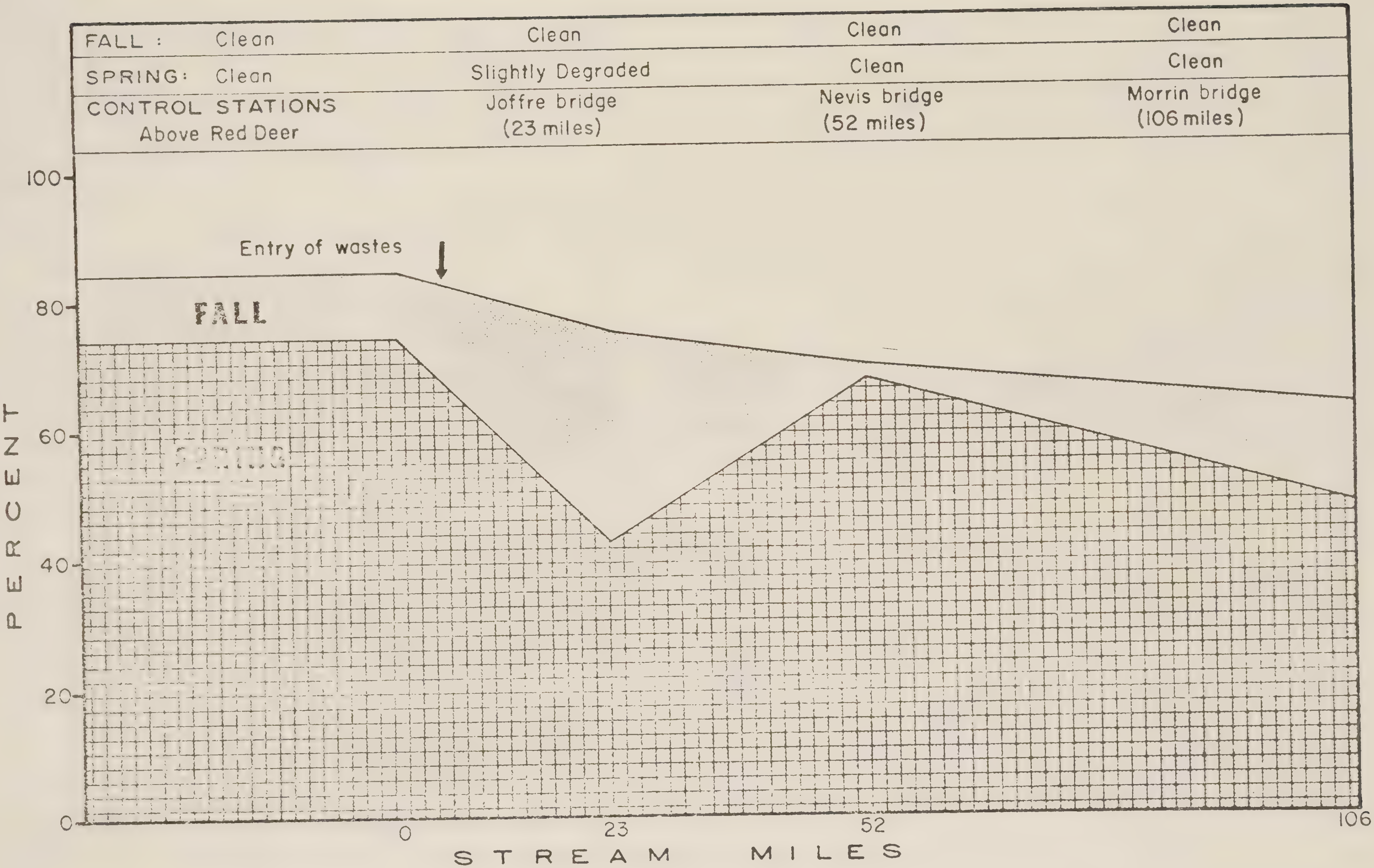

Figure 1. Red Deer River - The percent of clean water animals found at each sampling station in the fall and spring of 1970-1971.

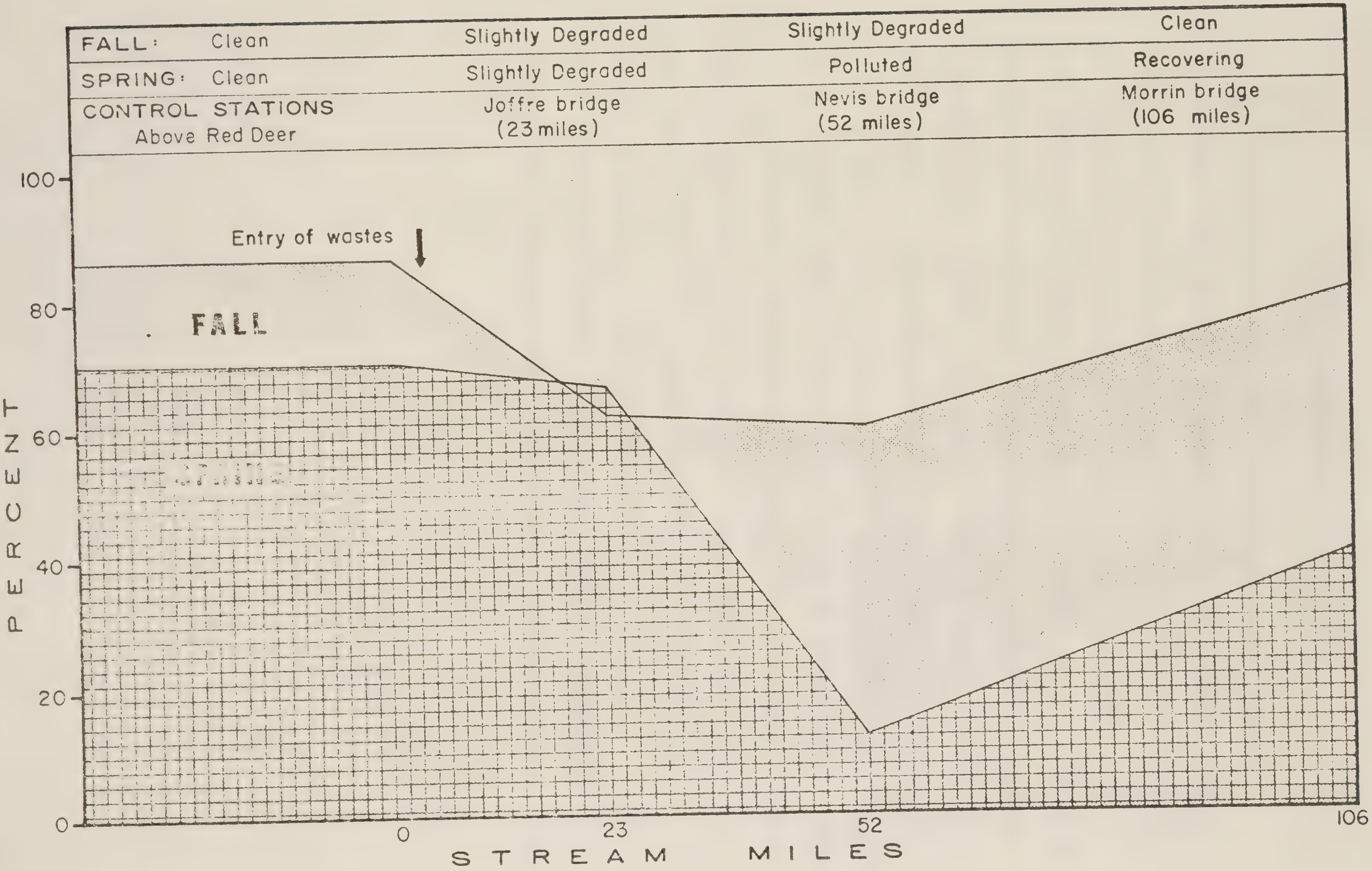

Figure 2. Red Deer River – The percent of clean water animals found at each sampling station in the fall and spring of 1969-1970.

NORTH SASKATCHEWAN RIVER REPORT

The biology of the North Saskatchewan River upstream and downstream from the City of Edmonton was investigated in relation to wastes arising from municipal and industrial discharges. Judgements regarding the pollution status of this river are presented in Fig. 1. These judgements are based on the definition of pollution as being any degradation of the natural biological state. The degree of degradation is expressed as a percent. The percent indicates what fraction of the total number of animals collected were clean water associated animals. As can be seen in Fig. 1, the percent of clean water associated organisms, such as stonefly, mayfly, and caddisfly larvae is reduced to zero percent for a distance of at least 40 river miles. The river begins to recover from this polluted state and appears to have recovered at a distance approximately 90 to 100 river miles downstream from Edmonton. Fig. 2, the 1969-70 results, is included for comparative purposes.

The establishment of more sample stations could probably provide a more accurate picture regarding the exact point of recovery.

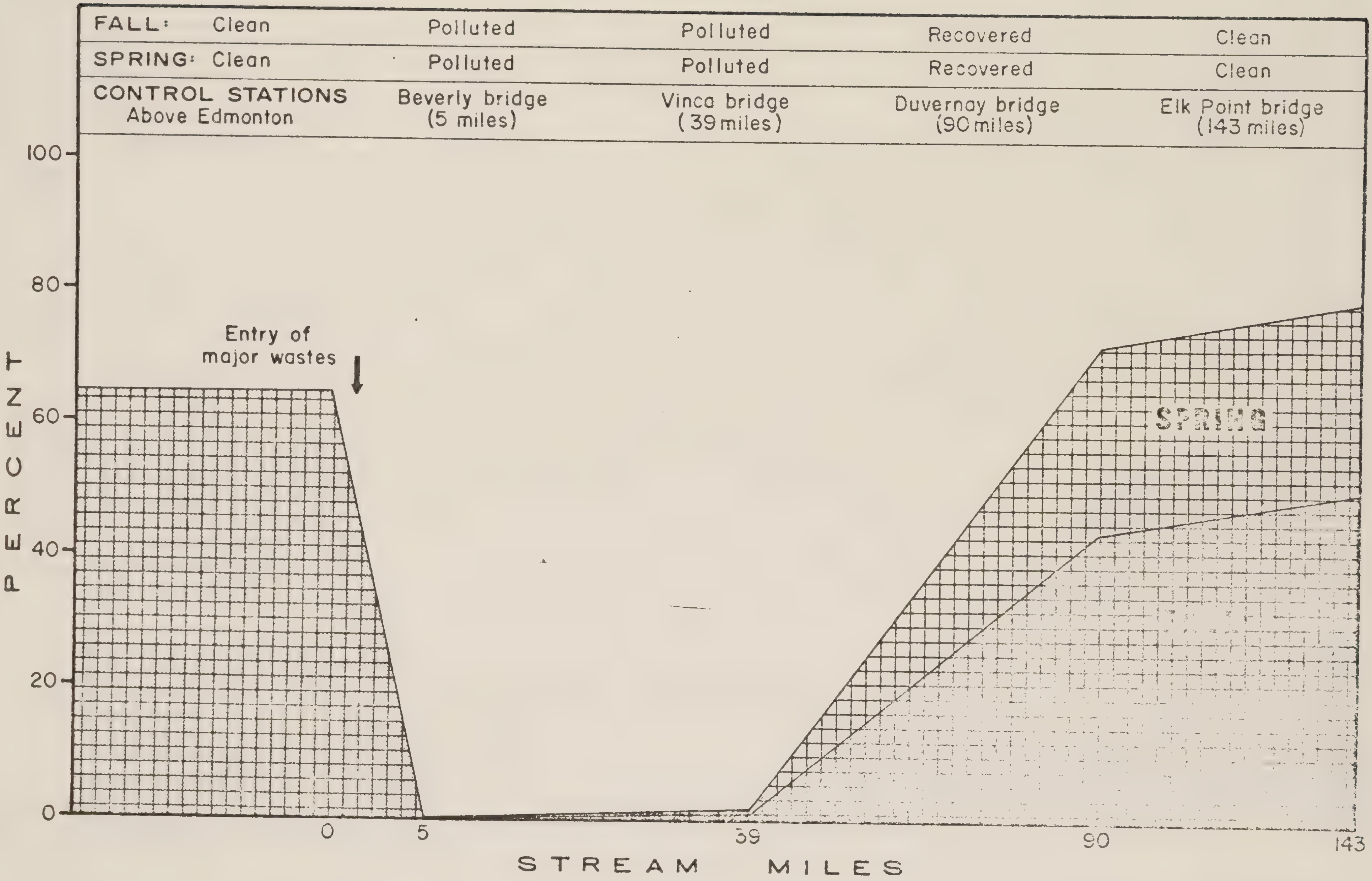

Figure 1. North Saskatchewan River - The percent of clean water animals found at each sampling station in the fall and spring of 1970-1971.

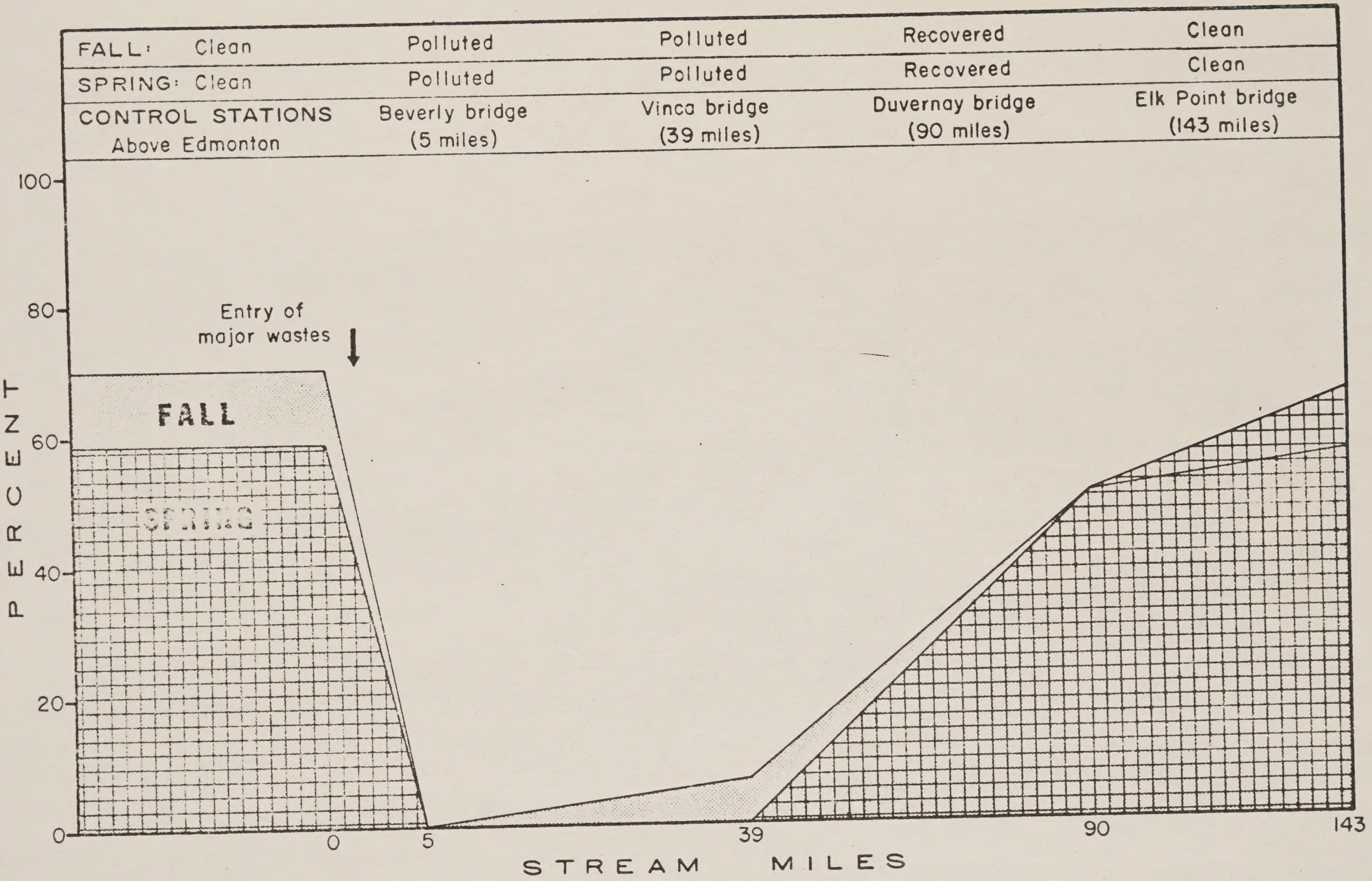

Figure 2. North Saskatchewan River - The percent of clean water animals found at each sampling station in the fall and spring of 1969-1970.